TWO DIMENSIONAL STEADY STATE HEAT EQUATION BY USING FINITE ELEMENT METHOD

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The purpose of this study is to investigate the application of numerical method toward steady state of heat diffusion equation in two dimensional geometry by applying Finite Element Method(FEM). FEMinvolves the finding of approximate solutions on boundary value problems for partial differential equations and it is well known as a tool in solving complicated problem such as irregular geometry. In FEM, variational method is used in order to minimize the error in energy function. The FEM calculation is coded in MATLAB language which is ideal for large scale iterations. The calculated results are compared with a well-known numerical method such as Finite Difference Method (FDM). FDMable to solve the same problem but limited to regular geometry and simple irregular geometry problems. The differences of these two methods lie in their error functions produce by respective equations. In conclusion, FEM generally will produce more accurate resultscompared to FDM.

A FARTHEST INSERTION HEURISTIC ALGORITHM FOR THE DISTANCE-CONSTRAINED CAPACITATED VEHICLE ROUTING PROBLEM

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The vehicle routing problem (VRP) under distance and capacity constraints involves the design of a set of delivery routes which originate and terminate at a central depot after satisfying the customer demands. Each customer must be served exactly once and by one vehicle, where vehicle capacity and distance limit become the constraints of the problem. In this study of Distance-Constrained Capacitated Vehicle Routing Problem (DCVRP), farthest insertion method is used to construct an initial solution. The method focuses on choosing the farthest customer from the route and then inserts the selected customer into the nearest path which will give the smallest increment of length without violating the distance and capacity constraints. C++ numerical programming is used to code the approach algorithm in order to solve DCVRP which involves large groups of data. Three categories of data which are cluster, random and random cluster data are being analyzed by considering different amount of distance and capacity constraints. By utilizing the farthest insertion method, the number of routes participated and the total distance travelled by the vehicles can be obtained. Based on the computational results acquired, the increasing of the amount of capacity and distance constraints will reduce the number of routes formed as well as the total distance travelled.